along a cross-section of the workpiece in a direction that is opposite to the direction of formation of the metal material during its deposition.

39. A method as set forth in Claim 37 wherein the annealing process comprises subjecting the workpiece to a controlled temperature gradient in which the temperature decreases along a cross-section of the workpiece in a direction that is opposite to the direction of the formation of the deposited metal material.

40. (Amended) A method for reducing voids in a metal material that has been electrolytically deposited into recessed microstructures defined on a surface of a microelectronic workpiece comprising:

electrolytically depositing a metal to at least partially fill recessed microstructures on the surface of the workpiece; and

then subjecting the surface of the workpiece to an annealing process in which the workpiece is subject to a controlled temperature gradient in which the temperature decreases along a cross-section of the workpiece in a direction that is opposite to the direction of the formation of the deposited metal material.

68. (New) A method for reducing voids in a metal material that has been electrolytically deposited into recessed microstructures defined in a surface of a microelectronic workpiece including at least one low-K dielectric layer, comprising:

electrolytically depositing a metal to at least partially fill recessed microstructures on the surface of the workpiece; and

subjecting the surface of the workpiece to an elevated temperature annealing process at a temperature that is selected to be below a predetermined temperature at which the low-K dielectric layer would suffer degradation of its mechanical and/or electrical properties.

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69. (New) A method for reducing voids in a metal material that has been electrochemically deposited into recessed microstructures defined in a surface of a microelectronic workpiece comprising:

electrochemically depositing a metal to at least partially fill recessed microstructures in the surface of the workpiece; and

then subjecting the surface of the workpiece to an annealing process at a temperature that is at or below about 250 to 300 degrees Celsius.

70. (New) A method for reducing voids in a metal material that has been electrochemically deposited into recessed microstructures defined in a surface of a microelectronic workpiece comprising:

electrochemically depositing a metal to at least partially fill recessed microstructures in the surface of the workpiece; and

subjecting the workpiece with deposited metal to an elevated temperature annealing process within a chamber, followed by subjecting the workpiece with deposited metal to a cooling process within the chamber.

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